

Shouichi MIYAWAKI et al.
Page 2

MAY 08 2007

Dkt. 1141/75707

Listing of Claims

The following listing of claims will replace all prior versions, and listings, of claims in the subject application:

Claim 1 (currently amended): A magnetic resonance imaging method comprising:

- (1) a step for applying one or more pulses of the gradient magnetic field sequentially and detecting nuclear magnetic resonance signals for reconstructing magnetic resonance images;
 - (2) a step for calculating the ~~a~~ residual magnetic field being generated in the magnetic device by the applied gradient magnetic field on the basis of the residual magnetic field response function that represents the relation between the strength of the applied gradient magnetic field and the strength of the residual magnetic field being generated by the applied gradient magnetic field; and
 - (3) a step for correcting the ~~calculated~~ residual magnetic field calculated in the step (2) along with the application of each pulse of the gradient magnetic field;
 - (4) ~~wherein the magnetic resonance imaging method includes~~ a step for updating the residual magnetic field response function ~~used in step (2) by making it depend on the application history of the sequentially applied gradient magnetic field in accordance with the strength of each pulse of the applied gradient magnetic field along with the application of the gradient magnetic field pulses,~~
- wherein the calculation of the residual magnetic field in step (2) is executed by using the residual magnetic field response function updated in step (4).

Shouichi MIYAWAKI et al.
Page 3

Dkt. 1141/75707

Claim 2 (original): A magnetic resonance imaging method according to claim 1, wherein before the steps (1) ~ (4) are performed,

(5) a step for degaussing the residual magnetic field being generated in the magnetic device, and for initializing the residual magnetic field response function to the state after degaussing.

Claim 3 (currently amended) : A magnetic resonance imaging method according to claim [[1]] 2, wherein before steps (1) ~ (5) are performed,

(6) a step for obtaining the residual magnetic field response function after degaussing or after degaussing and applying one or more gradient magnetic field pulses, and for storing it as the calibration data is performed.

Claim 4 (currently amended) : A magnetic resonance imaging method according to claim 1, wherein ~~upon application~~ the correction of the residual magnetic field in step (3) is performed by superposing the correction magnetic field over the gradient magnetic field.

Claim 5 (original): A magnetic resonance imaging method according to claim 4 wherein the superposed and applied correction magnetic field is the gradient magnetic field that has the same axis as the previously mentioned gradient magnetic field.

Shouichi MIYAWAKI et al.
Page 4

Dkt. 1141/75707

Claim 6 (original): A magnetic resonance imaging method according to claim 5 wherein the superposed and applied correction magnetic field includes components other than the gradient magnetic field that has the same axis as the previously mentioned gradient magnetic field.

Claim 7 (previously presented) : A magnetic resonance imaging method according to claim 1, wherein the correction of the residual magnetic field in step (3) is performed by varying the strength of the gradient magnetic field for applying to correct the residual magnetic field of which its strength is previously calculated.

Claim 8 (currently amended) : A magnetic resonance imaging method according to claim [[1]] 3, wherein the residual magnetic field response function is represented by drawing a residual magnetic field response curve on a two-dimensional chart of which the x-axis indicates the applied gradient magnetic field and the y-axis indicates the residual magnetic field being generated by the application of the gradient magnetic field.

Claim 9 (currently amended) : A magnetic resonance imaging method according to claim [[1]] 8, wherein the updating of the residual magnetic field response function by step (4) includes:

Shouichi MIYAWAKI et al.
Page 5

Dkt. 1141/75707

- (7) a step for varying the value of Y, in the residual magnetic field response curve shown in the ~~above-mentioned~~ two-dimensional chart, so that it becomes the same value as calculated in step (2) in the range between zero and the strength of the applied gradient magnetic field pulse.
- (8) a step for drawing the residual magnetic field response curve of the ~~above-mentioned~~ two-dimensional chart so that the value of Y is varied from the value calculated in step (2) with a predetermined gradient in the opposite direction of the applied gradient magnetic field pulse being applied from zero by the value X.

Claim 10 (currently amended): A magnetic resonance imaging method according to claim 9 wherein the ~~above-mentioned~~ two-dimensional predetermined gradient is obtained on the basis of the calibration data stored in step (6).

Claim 11 (currently amended): A magnetic resonance imaging apparatus comprising:

a static magnetic field generation means for generating the static magnetic field in the imaging space where the subject is placed;

a gradient magnetic field generation means for applying the gradient magnetic field in the above-mentioned imaging space; [[and]]

a control means for controlling the application of the gradient magnetic field by the gradient magnetic field generation means; [[.]]

~~wherein the magnetic resonance imaging apparatus comprises a residual magnetic field~~

Shouichi MIYAWAKI et al.
Page 6

Dkt. 1141/75707

~~correction means being connected to the control means, for correcting the residual magnetic field being generated by the application of the gradient magnetic field taking into consideration the application history of the gradient magnetic field~~

a storage means for storing a residual magnetic field response function that represents the relation between the strength of the applied gradient magnetic field and the strength of a residual magnetic field being generated by the applied gradient magnetic field;

a calculation means for calculating the strength of the residual magnetic field being generated by the applied gradient magnetic field, by using the residual magnetic field response function and the information of the strength of the applied gradient magnetic field transmitted from the control means;

a residual magnetic field correction means for correcting residual magnetic field having the strength calculated by the calculation means, upon the application of the gradient magnetic field;

wherein the magnetic resonance imaging apparatus includes

an updating means for updating the residual magnetic field response function stored in the storage means in accordance with the strength of the applied gradient magnetic field along with the application of the gradient magnetic field;

and the calculation means calculates the residual magnetic field by using the residual magnetic field response function updated by the updating means.

Shouichi MIYAWAKI et al.
Page 7

Dkt. 1141/75707

Claim 12 (currently amended): A magnetic resonance imaging apparatus according to claim 11 wherein the residual magnetic field correction means comprises:

~~a residual magnetic field correction control means being connected to the control means, for controlling the correction of the residual magnetic field;~~

~~a storage means being connected to the residual magnetic field correction control means, for storing the residual magnetic field response function that depends on the application history of the gradient magnetic field; and~~

~~a correction magnetic field generation means being connected to the residual magnetic field correction control means, for applying the correction magnetic field to correct the residual magnetic field according to the residual magnetic field correction controlling signals that are inputted from the residual magnetic field correction control means.~~

Claim 13 (canceled).

Claim 14 (previously presented) : A magnetic resonance imaging apparatus according to claim 12, wherein the correction magnetic field is the gradient magnetic field that has the same axis as the previously mentioned gradient magnetic field.

Claim 15 (currently amended): A magnetic resonance imaging method according to claim 14 wherein the ~~superposed and applied~~ correction magnetic field includes components

Shouichi MIYAWAKI et al.
Page 8

Dkt. 1141/75707

other than the ones of the gradient magnetic field, that have the same axis as the previously mentioned gradient magnetic field.

Claim 16 (currently amended) A magnetic resonance imaging apparatus according to claim 12, wherein the correction magnetic field generation means is the correction coils.

Claims 17-18 (canceled).

Claim 19 (new): A magnetic resonance imaging apparatus according to claim 11 wherein the residual magnetic field correction means performs the correction by varying the strength of the gradient magnetic field.